

## Windsurfer Fin

**A**t right, windsurfing sailor Cort Larned is "taking air" (jumping off the wave) with the help of a new VooDoo™ Advanced Windsurfing Fin. Produced and marketed by Twist Wing International, Toronto, Ontario, the fin is based on NASA airfoil technology developed by Langley Research Center.

In researching the design of a new line of windsurfing fins, company engineers found a pertinent NASA technical report that detailed a Langley wind tunnel investigation of a variable camber and twist aircraft wing. Camber is the curve of an airfoil cross-section; for the Langley research, the test wing incorporated moveable segments at the wing's leading and trailing edges whose movements changed the camber of the wing. The technical report stated:

"The result of the investigation shows that, when properly incorporated, variable camber and twist can effectively reduce the drag of a thin low-aspect-ratio wing over a wide range of lift coefficients."

Since the hydrofoil fin is a close relative of an airfoil, the NASA report offered a way to substantially improve the performance of windsurfing fins. Twist Wing International adapted the NASA technology to the VooDoo design and identified materials that would provide the desired twist characteristics and could be used in volume production. The VooDoo fin is made of composite materials with two distinct aspects: a rigid internal spar and a flexible polymer exterior coating. Says Twist Wing vice president Keith Pires:

"The design of our products enables the windsurfing fin to twist at the trailing edge of the foil with progressively more pronounced twist toward the tip. In a series of arms-length tests by professional sailors in Lago di Garda, Italy, it was determined that the capabilities of VooDoo fins dramatically improved upwind performance



in comparison to similar windsurfing fins of standard construction (having limited or no twist).” In addition, says Pires, composite construction makes the fin exceptionally durable.

In designing the VooDoo fins, Twist Wing selects a NASA foil section and mathematically models it, using ALIAS computer design software, which allows interrogation of the design to determine aspect ratio, camber and volume of the hydrofoil. Critical tolerances are precisely controlled by computer-aided design and manufacturing tools. The digital information is then used to create precision metal tooling for volume production. VooDoo fins are being sold in the U.S., Canada, Mexico, the United Kingdom and Italy.

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